Hepatitis B

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

The hepatitis B virus (HBV) is a DNA hepadnavirus. Infection results in production of measurable antibody to hepatitis B surface antigen (HBsAg), hepatitis B core antigen (HBcAg), and hepatitis B e antigen (HBeAg).

B. Clinical Description

Infection with HBV may result in **acute** or **chronic** disease, both of which can be asymptomatic. If symptoms are present, onset of **acute** disease is usually insidious with loss of appetite, vague abdominal discomfort, nausea, vomiting and sometimes arthralgias and rash, often progressing to jaundice. Fever may be absent or low-grade. Liver enzyme levels are markedly elevated. Severity ranges from inapparent cases (detectable only by liver function tests) to fulminant, fatal cases. The case fatality rate in hospitalized patients is about 1%. Disease tends to be worse and mortality higher in those over 40 years old. As with hepatitis A, asymptomatic infections are common in children less than 10 years of age. Approximately 30% to 50% of older children, adolescents and adults have asymptomatic infections.

The risk of **chronic** infection decreases with age at infection. As many as 90% of infants infected at birth (perinatally) develop chronic HBV infection, compared to an average of 30% of children infected between 1 and 5 years of age and 2–6% of those acquiring infection as older children or adults. Chronically infected persons are at increased risk for developing chronic liver disease (*e.g.*, cirrhosis or chronic hepatitis) or liver cancer (primary hepatocellular carcinoma) later in life. Approximately 25% of those infected during early childhood will ultimately die at an early age from the complications of cirrhosis and liver cancer.

C. Reservoirs

Humans are the only natural hosts.

D. Modes of Transmission

HBV is transmitted through blood or body fluids via a parenteral or permucosal (mucous membrane) exposure. The highest concentrations of the virus are in blood and serous fluids; lower titers are found in semen; and even lower titers in saliva.

Some examples of parenteral exposures are: needle sticks, sharing or reusing nonsterile needles or syringes, transfusion of blood and blood products (rare in the US due to current blood donor screening and testing protocols), hemodialysis, acupuncture, and tattooing. The most common permucosal exposures are through perinatal transmission from an infected mother to her infant at birth (vertical transmission) and sexual (heterosexual and homosexual) activity (horizontal transmission). Permucosal exposures also occur in laboratories and healthcare settings, contributing to horizontal transmission in facilities and communities.

Person-to-person spread of HBV can occur in settings involving interpersonal contact over extended periods, such as when a chronically infected person resides in a household. In household settings, nonsexual transmission occurs primarily from child to child, and young children are at highest risk for infection. The precise mechanisms of transmission from child to child are unknown; however, frequent interpersonal contact of nonintact skin or mucous membranes with blood-containing secretions or, perhaps, saliva are the most likely

means of transmission. Transmission from sharing objects, such as wash cloths, towels, or toothbrushes, also can occur because HBV can survive at ambient temperatures in the environment for days and even weeks. Fecal-oral transmission does not appear to occur. Approximately one-third of infected persons do not have a readily identifiable risk factor.

E. Incubation Period

The incubation period of HBV infection is an average of 90 days, with a range of 45 to 160 days.

F. Period of Communicability or Infectious Period

A person is considered infectious as long as hepatitis B surface antigen (HbsAg) is detectable in the blood. Most people are infectious from 1 to 2 months before to 1 to 2 months after the onset of symptoms. Persons who have **chronic hepatitis B** (known as **carriers**) remain infectious indefinitely. Persons with acute and chronic hepatitis B with circulating hepatitis B e antigen (HbeAg) are more infectious than those that are HbeAg negative. Measurable levels of HbeAg are associated with higher levels of HBV replication.

G. Epidemiology

Worldwide, HBV is a major cause of chronic liver disease and liver cancer. The frequency of HBV infection and patterns of transmission vary greatly throughout the world. In most areas of the United States, Canada, Western Europe, Australia, and southern South America, the infection rate is low and occurs primarily in adolescents and adults; 5% to 8% of the total population have been infected, and 0.2% to 0.9% have a chronic infection.

Within the US, there are pockets of high endemicity, including first-generation immigrants from areas where HBV is endemic, Alaskan Natives and inner city groups. The highest risk of early childhood infections is among children born to mothers from HBV endemic countries. The majority of early childhood infections, however, occur among African American and white children. Before routine childhood immunization in the US, it is estimated that approximately 33,000 children born to HbsAg-negative mothers were infected each year during their early childhood. In developed countries, populations at high risk for HBV exposure include: injecting drug users, heterosexuals with multiple partners, homosexual men, residents and staff in institutions for the developmentally disabled, employees in hemodialysis centers, and people in certain healthcare and public safety occupations.

In contrast, in China, Southeast Asia, the Pacific Islands, eastern Europe, the Central Asian republics, most of the Middle East, Africa, the Amazon Basin, and some Caribbean islands, HBV infection is highly endemic, with a lifetime risk of HBV infection greater than 60%. In these areas, most infections occur in infants or children under the age of 5 years, 70% to 90% of the adult population has been infected, and 8% to 15% have a chronic infection. In the rest of the world, HBV infection is of intermediate endemicity with chronic HBV carriage occurring in 2% to 7% of the population.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. What to Report to the Massachusetts Department of Public Health

The following table (page 3) contains selected hepatitis B serologic markers (what's looked for in blood samples) and their definitions. These are relevant to the reporting requirements.

Hepatitis B Serologic Markers*

Marker	Abbreviation	Definition/Significance
Hepatitis B surface antigen	**HBsAg**	Indicates infectivity. Present in acutely and chronically infected persons. Persists indefinitely in **chronic** carriers.
IgG antibody to hepatitis B surface antigen (HBsAg)	**anti-HBs**	Indicates immunity, either from past infection or vaccination.
Total, or IgG, antibody to hepatitis B core antigen (HBcAg)	**anti-HBc**	Indicates prior infection at some unknown time. Immunization does **not** produce anti-HBc.
IgM antibody to hepatitis B core antigen (HBcAg)	**IgM anti-HBc**	Indicates infection within the past 6 months (including in HBsAg-negative persons during the "window" phase of infection). This is the **best** test to diagnose **acute** hepatitis B.
Hepatitis B e antigen	**HBeAg**	Identification of infected persons at increased risk for transmitting HBV. Seen transiently in most infections, and persists indefinitely in *some* carriers.
Antibody to hepatitis B e antigen (HBeAg)	**Anti-HBe**	Identification of infected persons with lower risk for transmitting HBV.

*Patients usually have several hepatitis B serological tests done in order to establish a diagnosis. Please see Attachment A: *Interpretation of Select Hepatitis B Serologic Tests* (end of this chapter) for a chart of hepatitis B tests results and their interpretation.

Report the following:

- IgM antibody to hepatitis B core antigen (anti-HBc) positive, or
- hepatitis B surface antigen (HBsAg) positive

Note: Please feel free to consult with the epidemiologist on-call at the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850 for assistance in the interpretation of laboratory results or if you have any other questions regarding a case of hepatitis B infection (acute and/or chronic). Refer to Section 3) C [page 4] for information on how to report a case.

B. Laboratory Testing Services Available

The Massachusetts State Laboratory Institute (SLI) does not perform routine laboratory testing for hepatitis B for the general public. Testing is generally conducted through private, commercial laboratories.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify sources/sites of transmission and to prevent spread from such sources.

- To ensure identification of infected pregnant women and prevent perinatal transmission to their babies.

B. Laboratory and Healthcare Provider Reporting Requirements

Refer to the lists of reportable diseases (end of this manual's Introduction) for information. *Note:* Healthcare providers, hospitals and laboratories are reminded to report all cases of HBsAg-positive pregnant women.

C. Local Board of Health Reporting and Follow-Up Responsibilities

1. **Reporting Requirements**

Massachusetts Department of Public Health (MDPH) regulations (*105 CMR 300.000*) stipulate that each local board of health (LBOH) must report the occurrence of any case of hepatitis B, as defined by the reporting criteria in Section 2) A. Current requirements are that cases be reported to the MDPH Division of Epidemiology and Immunization, Surveillance Program using an official MDPH *Hepatitis B Case Report* form (in Appendix A).

Note: Because the process of obtaining information for a case report form can take time, a local board of health should initially send or fax the lab report to the Surveillance Program within 24 hours, with a notation that a case report form will follow (see Section 2.e on the following page for fax and address). *This is especially important if the case is pregnant.* (If you received the lab report from the Surveillance Program or the State Laboratory Institute there is no need to do this.) The local board of health should then follow-up with an official MDPH *Hepatitis B Case Report* form.

2. **Case Investigation**

a. **Complete a Hepatitis B Case Report form:**

Complete a *Hepatitis B Case Report* form by interviewing the case and others who may be able to provide the pertinent information. (Copy of the form can be found in Appendix A.) Most of the information required on the form can be obtained from the healthcare provider or the medical record. Keep the following points in mind when completing the case report form.

- If the case is a **woman of reproductive age** (14 to 44 years of age), it is important to document pregnancy status. If the case is pregnant, record estimated date of delivery, the expected location of delivery and the name, address and phone number of the obstetrical care provider. This information will facilitate follow-up by the HBPP, as described below.
- Be sure to record date and time of the onset of illness and symptoms accurately.
- Using the incubation period for hepatitis B (6 weeks to 6 months), pay special attention to the section on the *Hepatitis B Case Report* form that pertains to the Case Risk History. Some of these questions are quite sensitive in nature. Reassure the patient that all information is kept strictly confidential and is only obtained to determine their likely source of exposure and to protect others that might be at risk.

b. **Follow-up of pregnant hepatitis B carriers and their infants and families:**

In order to prevent perinatal transmission of hepatitis B, the Massachusetts Hepatitis B Prevention Project (HBPP) coordinates follow-up and case management for pregnant hepatitis B carriers and their infants and household contacts, with assistance from the local board of health and other programs. Case management ensures that the mother, obstetrician, delivery hospital, and pediatrician are aware of the need for vaccination of the infant, with reminders sent for each dose of vaccine, as well as post-vaccination screening. Follow-up is also done for screening and, if necessary, vaccination of household contacts.

To ensure that all cases are promptly referred to case management, please notify the MIP Perinatal Hepatitis B Nurse, at (617) 983-6800 or (888) 658-2850, as soon as you identify a pregnant hepatitis B carrier or an HBsAg-positive woman who has recently given birth.

c. **Follow-up of sexual and house hold contacts:**

Household and sexual contacts should be assessed and immunized, if necessary, according to the recommendations listed in Section 4: Controlling Further Spread below. Contacts requiring prophylaxis

should be listed on the case report form, including dates of any HBIG and/or vaccine that have been received. Refer to Attachment B (located at the end of this chapter) for specific guidance that will help you conduct a complete investigation and follow-up of contacts of an HBsAg-positive case.

d. If you have made a few attempts to obtain case information and are unsuccessful (*e.g.,* the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed) fill out the case report form with as much information as you have gathered and send or fax to the Surveillance Program.

e. After completing the case report form, attach lab report(s) and fax or mail (in an envelope marked "Confidential") to the MDPH, Division of Epidemiology and Immunization, Surveillance Program. The confidential fax number is (617) 983-6813. Call the Surveillance Program at (617) 983-6801 to confirm receipt of your fax. The mailing address is:
   MDPH, Division of Epidemiology and Immunization
   Surveillance Program, Room 241
   305 South Street
   Jamaica Plain, MA 02130

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

Minimum Period of Isolation of Patient
No restrictions except for exclusion from organ and blood donation and counseling to modify activities in order to prevent transmission.

Minimum Period of Quarantine of Contacts
Personal surveillance for high-risk contacts who should receive hepatitis B immune globulin (HBIG) and vaccine. Infants born to infected women should also receive HBIG and vaccine.

B. Protection of Contacts of a Case

Immunization of contacts: Products available for postexposure prophylaxis include hepatitis B immunoglobulin (HBIG) and hepatitis B vaccine.

1. **Infants born to HBsAg-positive mothers** should be treated as follows:
   a. Give HBIG (0.5 ml IM) and hepatitis B vaccine IM according to the following table:

Immunoprophylaxis of Infants Born to HBsAg-positive Mothers

Vaccine/HBIG Dose	Age
First hepatitis B vaccine	Birth (within 12 hours)
HBIG[1]	Birth (within 12 hours)
Second hepatitis B vaccine	1–2 months
Third hepatitis B vaccine	6 months

[1] Give HBIG (0.5ml IM) simultaneously with, but at a different site from, the first dose of hepatitis B vaccine.

b. Screen the infant for HBsAg and anti-HBs 1 to 2 months after third dose of hepatitis B vaccine, when the child is at least 9 to 15 months of age, to monitor the success or failure of the immunization. If HBsAg is not present and anti-HBs antibody is present, children can be considered protected.

c. Infants who do not respond to the initial vaccine series (are anti-HBs-negative) and are not HBsAg-positive should be given a second 3-dose series of hepatitis B vaccine (same schedule as initial series) and re-screened at 1 to 2 months after the last dose.

d. **Infants who become HBsAg-positive** should be referred to a pediatric hepatologist for follow-up and the parents should be counseled. Since perinatal HBV infection is a reportable disease, the HBsAg-positive infant should be reported to Massachusetts Department of Public Health and the Hepatitis B Nurse, as described in Section 3) C (page 4).

2. **Infants born to mothers whose HBsAg status is not known** should be given hepatitis B vaccine within 12 hours of birth while awaiting HBsAg test results on the mother. If the mother is determined to be positive, the infant should receive HBIG as soon as possible, within 7 days of birth. This child should then complete the 3-dose hepatitis B vaccination series according to the table in Section 4) B. 1. a (page 5). The child should then be screened for HBsAg and anti-HBs at 9 to 15 months of age, as described in Section 4) B. 1. b, above.

   If the mother is determined to be **HBsAg-negative**, the infant should complete the 3-dose hepatitis B vaccine series according to the table in Section 4) D. 1. a (page 9).

3. **Unvaccinated infants exposed to a primary caretaker with acute hepatitis B** should receive HBIG (0.5 mL), and should initiate and complete the 3-dose hepatitis B vaccine series according to the table in Section 4) D. 1. a (page 9) as soon as possible. Infants who have already started the vaccine series **do not** need HBIG, and should complete the vaccination series on schedule.

4. **Sexual contacts of a person with acute hepatitis B,** if susceptible, should receive a single dose of HBIG (0.06 mL/kg), if the HBIG can be given within 14 days of the last sexual exposure. In addition, they should initiate and complete a 3-dose series of hepatitis B vaccine according to the table in Section 4) D. 1. c (page 10).

5. **Sexual contacts of persons with chronic hepatitis B,** if susceptible, should initiate and complete the 3-dose series of hepatitis B vaccine according to the table in Section 4) D. 1. c (page 10).

6. **Nonsexual household contacts of a person with acute hepatitis B,** if susceptible, who have had a blood exposure to the index patient (such as sharing toothbrushes or razors) should receive a single dose of HBIG (0.06 mL/kg) and should initiate and complete the 3-dose series of hepatitis B vaccine according to the table in section 4) D. 1. c (page 10). The 3-dose hepatitis B vaccination series should also be considered for contacts who do not have a blood exposure; children and adolescents, especially, should be vaccinated according to the table in Section 4) D. 1. b (page 9).

7. **All household contacts, including infants, of persons with chronic hepatitis B,** if susceptible, should initiate and complete the 3-dose series of hepatitis B vaccine according to the tables in Sections 4) D. 1. a-c (starting on page 9), as soon as possible.

8. **Persons with percutaneous or mucous membrane exposures** to either an acute or chronic case, if susceptible, should receive postexposure prophylaxis according to the table below.

Recommended Postexposure Prophylaxis for Percutaneous or Permucosal Exposure to Hepatitis B Virus

Vaccination status of *exposed* person	Treatment when *source* is found to be:		
	HBsAg[1]-positive	HBsAg-negative	Unknown or not tested
Unvaccinated	Administer 1 dose of HBIG[3] and initiate hepatitis B vaccine series	Initiate hepatitis B vaccine series	Initiate hepatitis B vaccine series
Previously vaccinated: Known responder[2]	No treatment	No treatment	No treatment
Previously vaccinated: Known non-responder	2 doses of HBIG, or 1 dose of HBIG **and** initiate revaccination[4]	No treatment	If known high-risk source, treat as if source were HBsAg-positive
Previously vaccinated: Response unknown	Test exposed person for anti-HBs[5] • If adequate, no treatment • If inadequate, 1 dose of HBIG **and** a vaccine booster dose[6]	No treatment	Test exposed person for anti-HBs[5] • If adequate, no treatment • If inadequate, vaccine booster dose[6]

[1] Hepatitis B surface antigen.

[2] Responder is defined as a vaccinated person with adequate levels of serum antibody to HBsAg (*i.e.*, anti HBs > 10 mIU/mL).

[3] Hepatitis B immune globulin; dose 0.06 mL/kg, intramuscularly.

[4] Persons known not to have responded to a 3-dose vaccine series and to revaccination with 3 additional doses should be given 2 doses of HBIG (0.06 ml/kg), one dose as soon as possible after exposure and the second 1 month later.

[5] Adequate serum antibody response to hepatitis B surface antigen is $\geq$ 10 mIU/mL.

[6] The person should be evaluated for antibody response after the vaccine booster dose. For persons who received HBIG, anti-HBs testing should be done when passively acquired antibody from HBIG is no longer detectable (*e.g.*, 4–6 mo.); if they did not receive HBIG, anti-HBs testing should be done 1–2 months after the vaccine booster dose. If anti-HBs is found to be inadequate (< 10 mIU/mL) after the vaccine booster dose, 2 additional doses should be administered to complete a 3-dose revaccination series.

Table adapted from: American Academy of Pediatrics. *Red Book 2000: Report of the Committee on Infectious Diseases, 25th Edition*. Illinois, American Academy of Pediatrics, 2000:302.

C. Managing Special Situations

School and Daycare

The risk of transmission of HBV in school and daycare settings has always been very low. This risk is now even lower because the proportion of susceptible children is decreasing as requirements for hepatitis B immunization for entry into daycare, kindergarten, 7th grade and college are implemented. To prevent the transmission of hepatitis B and other bloodborne disease in these settings, however, the following guidelines should be followed.

Primary prevention: Ensure compliance with all hepatitis B immunization requirements for schools and daycare. Vaccination is also recommended for unvaccinated classmates of hepatitis B carriers who behave aggressively (*e.g.*, biting, frequent scratching) or who have medical conditions, such as open skin lesions (*e.g.*, generalized dermatitis or bleeding problems), that increase the risk of exposing others to infectious blood or serous secretions.

Secondary prevention: Persons exposed to potentially infectious blood or other body fluids should be treated according to the guidelines for "Postexposure Prophylaxis for Percutaneous or Permucosal Exposure to Hepatitis B Virus" outlined in the table above. However, in the case of a bite by a person whose hepatitis B status is unknown, it is unlikely that it will result in transmission and blood testing is not recommended for either biter or victim. The risk of HBV acquisition when a susceptible child bites an HBV carrier is not known. However, most experts would not give HBIG to the susceptible biting child who does not have oral mucosal disease when the amount of blood transferred is small.

Notification: Parents may wish to inform the school nurse or daycare program director about a child who is a known hepatitis B carrier to allow for proper precautions and assessment of behavior issues that could facilitate transmission. However, this is not necessary since policies and procedures to manage exposure to blood or blood-containing materials should already be established and implemented. Parents of other children attending the school/daycare **do not** need to be informed.

Exclusions: Adults and children ill with acute hepatitis B should stay home until they feel well, and fever and jaundice are gone. There is no reason to exclude a person with hepatitis B from employment or attendance once they have recovered from acute infection. Admission of a known hepatitis B carrier with specific risk factors, such as biting, open rashes or sores that can't be covered or bleeding problems, should be assessed on an individual basis by the child's doctor, school/daycare and responsible public health authorities. Because these children pose a risk to others in daycare, consideration may be given to exclusion from daycare until the aggressive behavior ceases or until all contacts have been vaccinated. However, over the next few years, the proportion of children who are immunized will increase. Concern about bites and HBV transmission should also decrease over this time period.

Prevention Guidelines: Whether or not individual hepatitis B carriers have been identified, it is important that school staff receive regular training on the prevention of bloodborne disease. Personnel should be educated about standard precautions for handling blood or blood-containing materials. All students should receive age-appropriate instruction regarding the potential dangers of contact with other people's blood and other body fluids. Some standard precautions include:

- Follow all procedures for hand washing and cleanliness.
- Always treat all blood as potentially dangerous fluid and observe universal precautions, including using disposable gloves when cleaning or removing blood or body fluid spills.
- Do not permit sharing of personal items that may become contaminated with blood or body fluids, such as toothbrushes, eating utensils, etc.
- Cover open skin lesions.
- Place disposable items contaminated with blood or body fluids in plastic bags in covered containers.
- Store contaminated clothing or washable items separately in plastic bag, and send them home with the owner for proper cleaning.
- Wash and sanitize surfaces of contaminated objects with a dilute solution of 1 1/2 cup household bleach in 1 gallon of water (1:10 dilution) applied for at least 30 seconds, made up on a daily basis, or disinfect objects by boiling objects for 10 minutes.
- Supervise closely to discourage and prevent aggressive behavior.
- Provide age-appropriate education to adolescents and young adults about prevention of sexually transmitted diseases, including hepatitis B.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases in your city/town is higher than usual, or if you suspect an outbreak, investigate clustered cases in an area or institution to determine source of infection. If evidence indicates a common source, applicable preventive or control measures should be instituted. Consult with the epidemiologist on-call at the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850 for assistance in investigation and the implementation and recommendation of other control measures.

D. Preventive Measures

General control and prevention measures include implementing all hepatitis B immunization requirements and recommendations, as described below.

1. **Pre-exposure Prophylaxis:** The Massachusetts Immunization Program provides hepatitis B vaccine for the following groups:

   a. **All infants.** Infants born to **HBsAg-negative mothers** should initiate and complete the 3-dose hepatitis B vaccine series, according to the following table.

Routine Schedule for Infants Born to HBsAg-Negative Mothers

Dose	Usual Age	Minimum Interval
1	Birth	--
2	1–2 months	1 month
3	6–8 months	2 months[1]

[1] Do not administer before 6 months of age

Note: Alternate dosing schedules are approved for use in the older age groups only. Except where indicated, there should be at least 1 month between the first and second doses of hepatitis B; the 3rd dose should be administered at least 4 months after the 1st dose and at least 2 months after the 2nd dose; in infants, the 3rd dose should never be given before 6 months of age. There are no maximum intervals.

   b. **All unvaccinated children and adolescents through 18 years of age** should initiate and complete the 3-dose hepatitis B vaccine series according to the following table.

Routine Schedule for Children (< 11 years of age) and Adolescents (11–19 years of age)

Dose	Usual Interval[1]	Minimum Interval[2]
1	--	--
2	1 month	1 month
3	5 months	2 months

[1] Schedule: 0, 1, 6 months
[2] Schedule: 0, 1, 4 months

Note:

- The minimum intervals between doses for the 3-dose hepatitis B vaccine schedule are the same as described in 4) D. 1. a, above. For older children and adolescents, doses may be given in a schedule of 0, 1, and 6 months or 0, 1–2, and 4–6 months. For adolescents, spacing at 0, 12, and 24 months results in equivalent immunogenicity.
- Adolescents (11 to 15 years of age **only**) may also use a **2-dose scheduling option**. This can be accomplished by administering, per dose, **either**:
  - 1.0 ml of Merck's Recombivax HB® Adult Formulation (*1 X 10 mcg/1.0 ml*); **or**
  - 1.0 ml of Merck's Recombivax HB® Pediatric Formulation (*2 X 5.0 mcg/0.5 ml*).

  Administer the 1st dose at month 0, and the 2nd dose 4–6 months later (minimum interval between doses is 4 months).

  Both doses must be administered while the adolescent is 11-15 years of age, with the 2nd dose given by the 16th birthday. SmithKline Beecham's hepatitis B formulation is not currently licensed for the 2-dose schedule, but may be in the future.

c. **Massachusetts public employees who are at risk of occupational exposure to blood and body fluids** should initiate and complete the 3-dose series of hepatitis B vaccine according to the following table. The vaccine is distributed to state agencies, and county and local governments.

Routine Schedule for Adults

Dose	Usual Interval[1]	Minimum Interval[2]
1	--	--
2	1 month	1 month
3	5 months	2 months

[1] Schedule: 0, 1, 6 months
[2] Schedule: 0, 1, 4 months

Note: The minimum intervals between doses are the same as described in D. 1. a, above.

d. The Massachusetts Immunization Program currently provides hepatitis B vaccine at all public provider sites for the following **at-risk adults**. They should initiate and complete the 3-dose hepatitis B vaccine series according to the table in Section 4) D. 1. c, above.
- Health science college students (will expand to include all college students by 2005).
- Household contacts and sexual partners of HBV carriers.
- Users of intravenous drugs.
- Sexually active heterosexual persons with more than one sexual partner in the last 6 month, or who have a sexually transmitted disease.
- Sexually active men who have sex with men
- Healthcare personnel and others at occupational risk of exposure to blood or blood-contaminated body fluids.
- Residents and staff of institutions for developmentally disabled persons.
- Staff of nonresidential child care and school programs for developmentally disabled persons, if the program is attended by a known HBV carrier.
- Patients undergoing hemodialysis.
- Patients with bleeding disorders who receive clotting factor concentrates.
- Members of households with adoptees who are HBsAg-positive.
- International travelers to areas in which HBV infection is of high or intermediate endemicity.
- Inmates of juvenile detention and other correctional facilities.

For the most recent information about availability of hepatitis B vaccine, contact the MIP at (617) 983-6800 or (888) 658-2850.

2. **State Immunization Requirements:** Hepatitis B vaccine is required for all children who are enrolled in preschool or daycare, at kindergarten entry and seventh grade entry. This requirement is being phased in and will apply to all grades K–12 by 2004. Please refer to the MDPH's *Immunization Guidelines* for the most recent information about immunization requirements and the grades to which they apply. You can obtain this document by calling the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850.

   As of the year 2000, hepatitis B vaccine is required for all health science students attending college. A hepatitis B vaccine requirement for all college students will be phased in incrementally and apply to freshman in 2001; freshmen–sophomores in 2002; freshmen–juniors in 2003; freshmen–seniors in 2004; and freshmen-all graduate students in 2005.

   The Occupational Safety and Health Administration (OSHA) of the US Department of Labor has issued a regulation requiring some employers of workers at risk for occupational exposure to HBV to offer HBV immunization to these employees at the employer's expense.

3. **Education:** The Division of Epidemiology and Immunization has numerous written, audio and video materials targeting adolescents, adults and healthcare providers with information about hepatitis B. Please call (617) 983-6800 or (888) 658-2850 for information about available materials.

   A *Hepatitis B Public Health Fact Sheet* can be obtained from the Division of Epidemiology and Immunization or through the MDPH website at <http://www.state.ma.us/dph/>. Click on the "Publications" link and scroll down to the Fact Sheets section.

ADDITIONAL INFORMATION

The following is the formal CDC surveillance case definition for *acute* hepatitis B. It is provided for your information only and should not affect the investigation or reporting of a case that fulfills the criteria in Section 2) A of this chapter. (CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting.) For reporting a case to the MDPH, always use the criteria outlined in Section 2) A.

Acute Hepatitis B (as defined by CDC)
Confirmed
A case that meets the clinical case definition and is laboratory confirmed (see criteria below).

Clinical case definition
An acute illness with a) discrete onset of symptoms and b) jaundice or elevated serum aminotransferase.

Laboratory criteria for diagnosis
- IgM antibody to hepatitis B core antigen (anti-HBc) positive (if done), or
- hepatitis B surface antigen (HBsAg) positive and IgM antibody to hepatitis A virus (anti-HAV) negative (if done).

Acute Perinatal HBV Infection Acquired in the United States or US Territories
Clinical case definition
Perinatal hepatitis B in the newborn may range from asymptomatic to fulminant hepatitis.

Laboratory criteria for diagnosis
- Hepatitis B surface (HBsAg) antigen positive.

Case classification
HBsAg positivity in any infant aged $\geq$ 1–24 months who was born in the United States or in US territories to an HBsAg-positive mother.

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Attachment A: Interpretation of Select Hepatitis B Serologic Tests (1 page)

Attachment B: Issues to Discuss With People Who are Infected With Hepatitis B Virus (HBV) About Their Contacts (2 pages)

Note: These attachments are separate PDF files. To access them, go back to the *Guide to Surveillance and Reporting* main page, and click on the H–K drop down menu. Each attachment is listed under Hepatitis B.